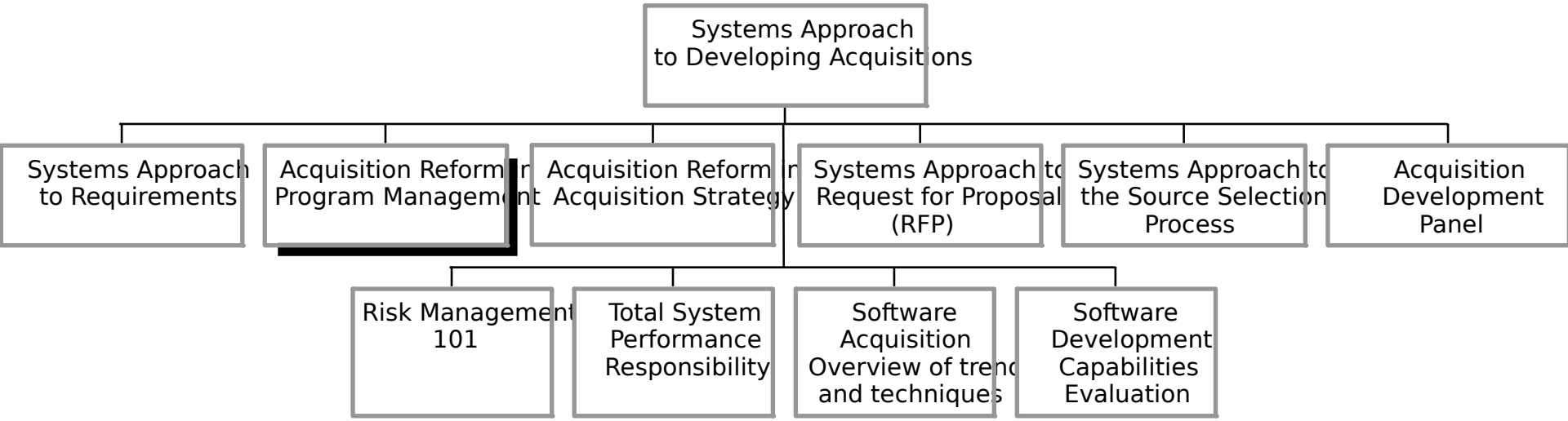
INTEGRATED PRODUCT DEVELOPMENT

SMC/AXD
Ronald G. Martin
ACQUISITION CENTER OF EXCELLENCE
ACQUISITION DEVELOPMENT DIVISION
25 October 2002

Systems Approach to the Development of Acquisitions


Systems Approach to Developing Acquisitions
Systems Approach to Requirements
Acquisition Reform in Program Management
Acquisition Reform in Acquisition Strategy
Systems Approach to Request for Proposal (RFP)
Systems Approach to the Source Selection Process
Acquisition Development Panel
Risk Management 101
Total System Performance Responsibility
Software Acquisition Overview of trends and techniques
Software Development Capabilities Evaluation

Outline

- Introduction
  - Integrated Product Development (IPD)
  - IPD Objectives
  - Acquisition Approach
  - RFP/Proposal/Contract
- Integrated Management Framework (IMF)
  - IMP Features and Attributes
  - IMS Features and Attributes
  - IPT Tools
- Summary

Introduction

- Integrated Product Development (IPD)
  - *"Systematically Employ a Team of Functional Disciplines to Integrate and Concurrently Apply All Necessary Processes to Produce an Effective and Efficient Product That Satisfies Customer's Needs"*
  - Processes and Resources to Provide Rapid, Cost Effective, Customer Focused Product Development
- Integrated Management Framework (IMF)
  - Disciplined, Organized Management System for All Contract Activities
  - Used by the IPTs in the Conduct of Their Efforts

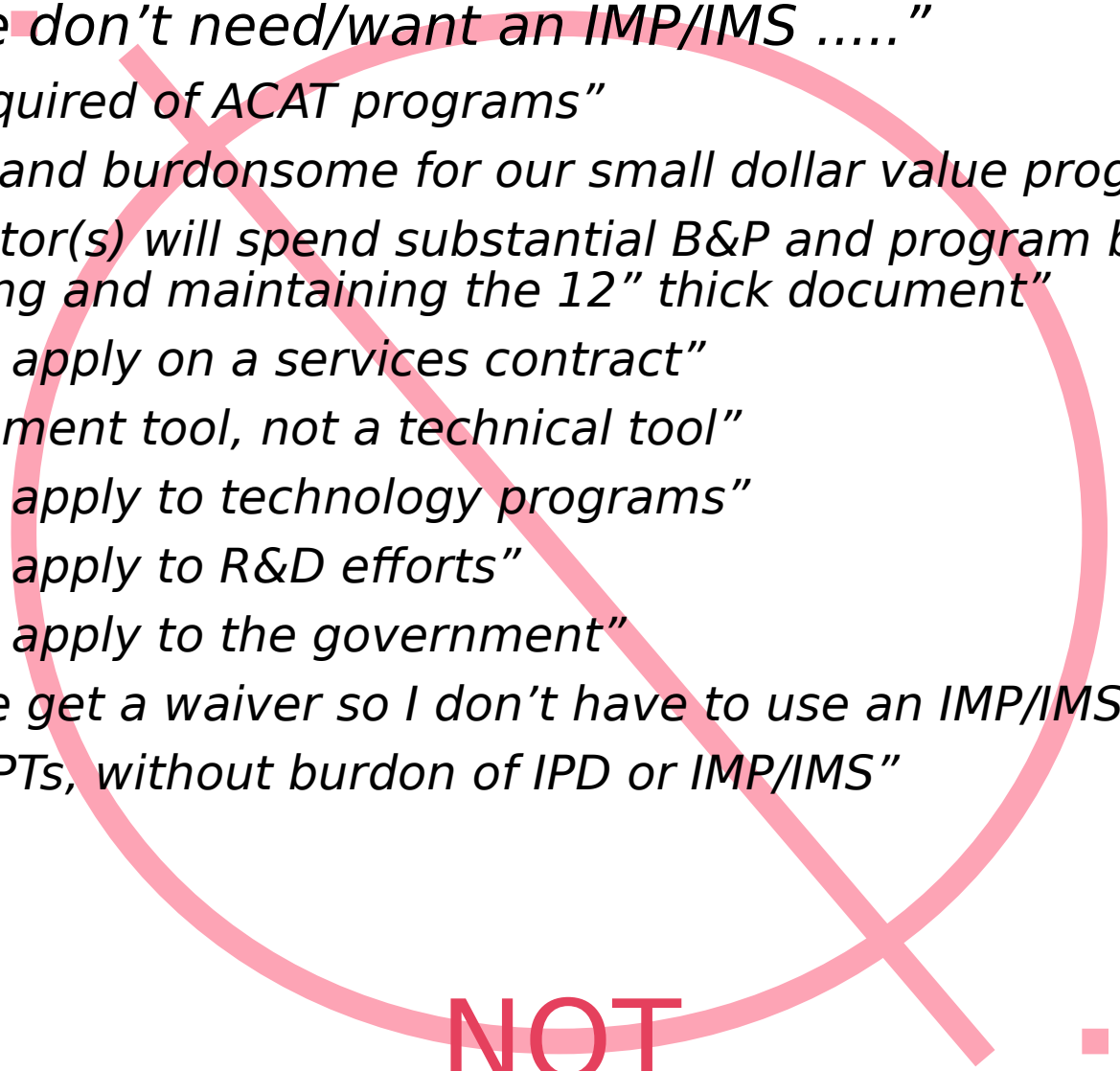
Integrated Product Development (IPD)

- Key Features
  - Product Focus
  - Cross Functional Teaming
  - Empowerment
  - Up-front Planning
  - Seamless IPD Tools
  - Integration Throughout the Lifecycle
- Benefits
  - Reduced Time to Field System
  - Reduced System Cost
  - Improved Quality
  - Program Is Easier to Manage
- Implementation
  - Cultural Change
  - Cooperation and Communication

Misconceptions About IMP/IMS

"Why we don't need/want an IMP/IMS ....."

- *"Only required of ACAT programs"*
- *"Too big and burdonsome for our small dollar value program"*
- *"Contractor(s) will spend substantial B&P and program budget generating and maintaining the 12" thick document"*
- *"Doesn't apply on a services contract"*
- *"Management tool, not a technical tool"*
- *"Doesn't apply to technology programs"*
- *"Doesn't apply to R&D efforts"*
- *"Doesn't apply to the government"*
- *"Help me get a waiver so I don't have to use an IMP/IMS"*
- *"I want IPTs, without burdon of IPD or IMP/IMS"*



Range of Program Types and Sizes Applying IPD and IMP/IMS

- GPS IIF - $2B, 25 yr navigation system sustainment
- SLRS & SCN - $900M, 10 yr System engr, integration, and incremental delivery
- GPS CSEL - $39M, 5 yr radio/nav system development and production
- CTTP - 5 yr operational system sustainment services (task order)
- GPS NAVWAR - ~$4M, 1 yr studies and support (PRDA solicitation)
- EELV, ATLAS L/V Follow-on, ABL, Titan IV L/V Follow-on, Network Integration Contract, DSCS SLEP, many more ....
- (all SMC acquisitions)

Framework For IPD (Acquisition)

Requirements — Customer requirements reflected in performance-oriented specifications

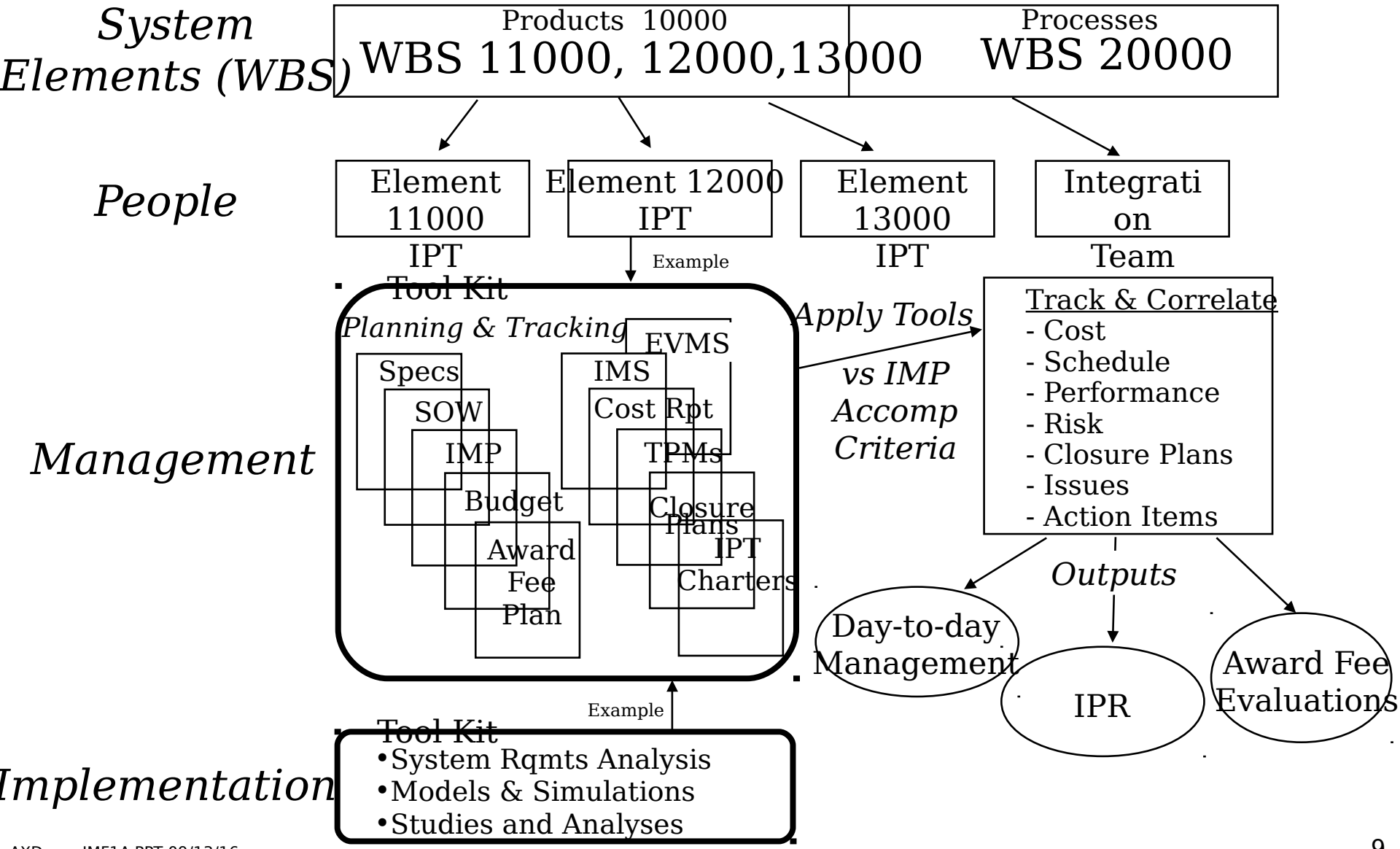
Outline — Develop outline of entire program; Single numbering system (Reqts/Work/Plan/Schedule/$)

Plan Program — Event driven plan (IMP); Details significant accomplishments and success criteria

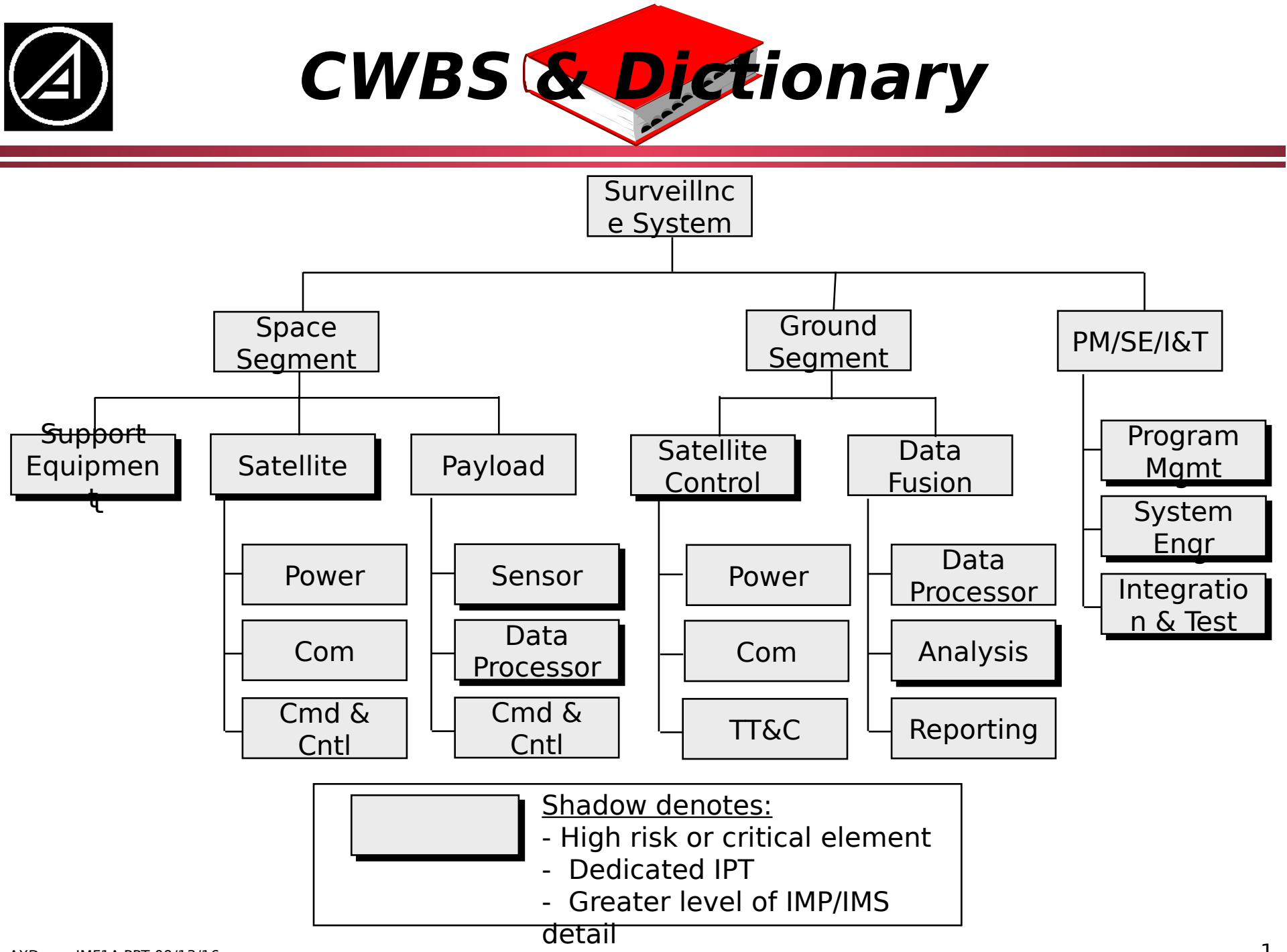
Allocate Resources — Schedule and $ tied to IMP; Driven to lowest level possible

Track & Execute — Track progress; Measure progress

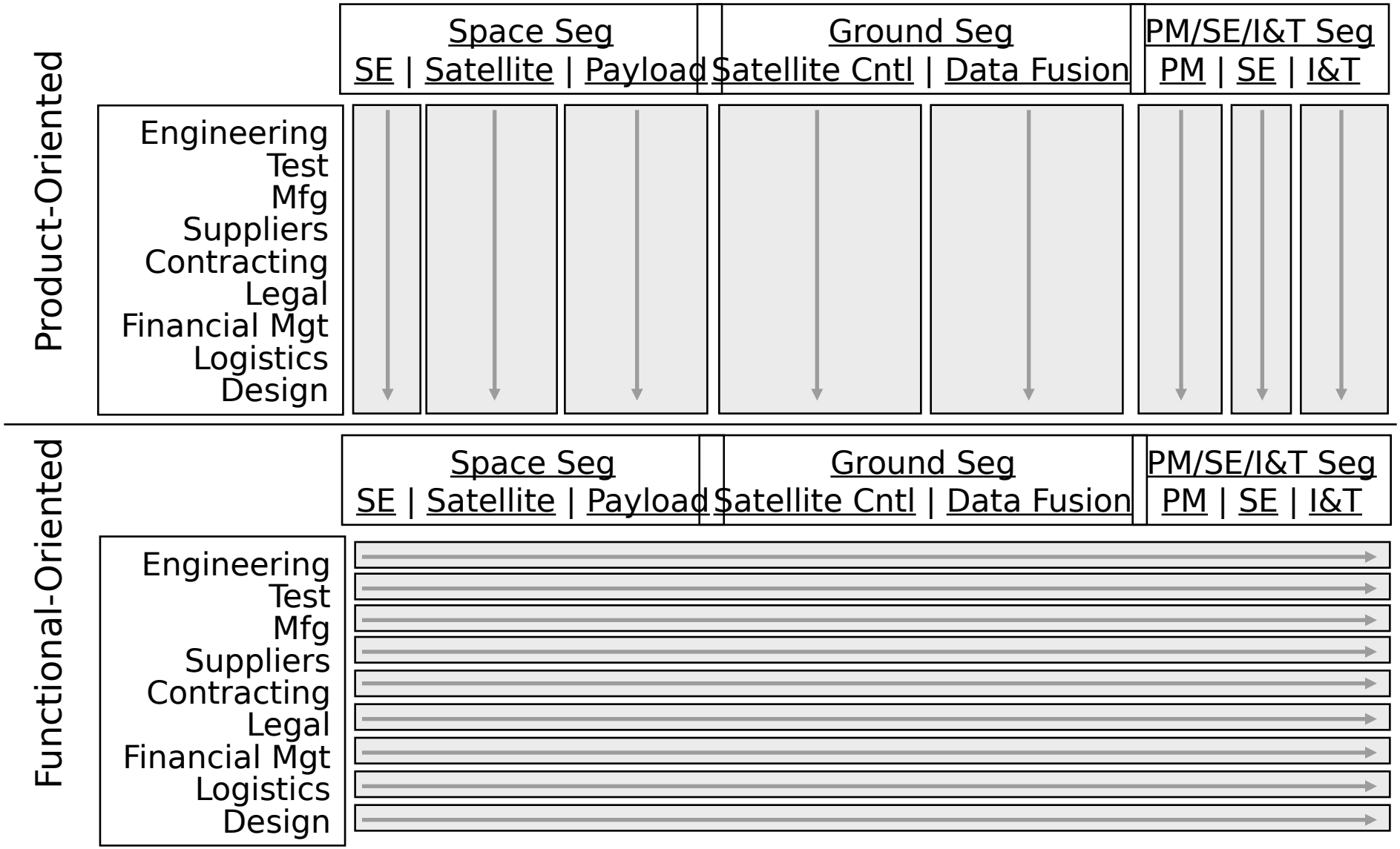
Seamless IPD Tools



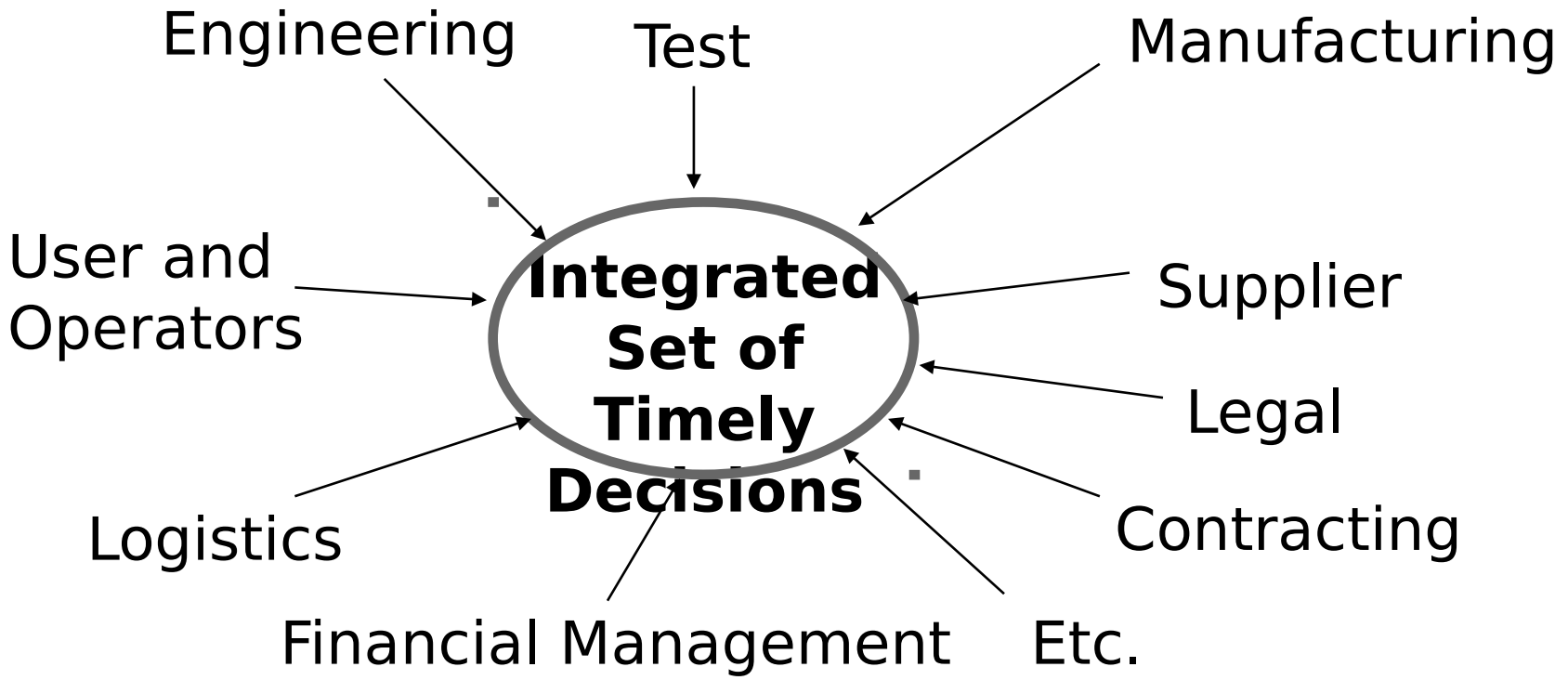
CWBS & Dictionary



Product vs Functional Focus



Right People, Right Place, Right Time, Making Smart Decisions



Life cycle decisions based on combined inputs of all team members

IMF Relationships

Gov't-Developed | Gov't Samples | Contractor-Developed

Performance Req'ts

Statement of Objectives

WBS

00000 System
30000 Space V
31000 Payload

Dictionary

:
30000 Space Veh
:
31000 Payload
:

CLINs

System Spec

31000: The Payload shall detect specified targets with 90% accuracy, 99.9% reliability and 85% availablity.

Statement of Work

31000: The Contractor shall develop, mfg, test,and integrate the payload according to specified performance.

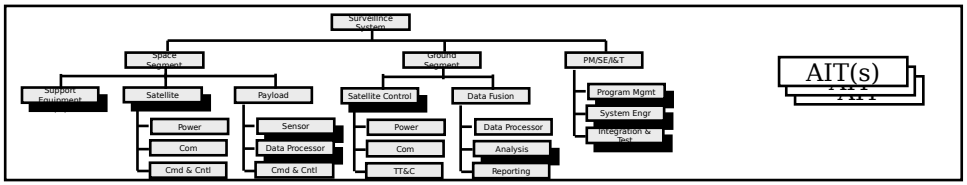
Integrated Master Plan

WBS	Events	Signfcant Accomplshmnts	Accomplishment Criteria	IPT
	DR#1			
31000	X	1. Prelim Design compl'd	1a. Subsys perf reqts alloc b. Duty cycle defined c. Prelim drawings released	SE Sat AIT

Integrated Master Schedule

WBS	Detailed Task	Program Events	19XX	19XX	19XX	IPT
					DR#1	
31000	1a. Perform subsys analyses to define rqmts b. Analyze loads to define duty cycles c. Complete system and subsys drawings					SE Sat AIT

Integrated Product Teams



Integration aspect accomplished with common numbering system.

WBS-IMP-IMS-IPT

WBS

00000 System
30000 Space V
31000 Payload

Dictionary

30000 Space Veh
31000 Payload

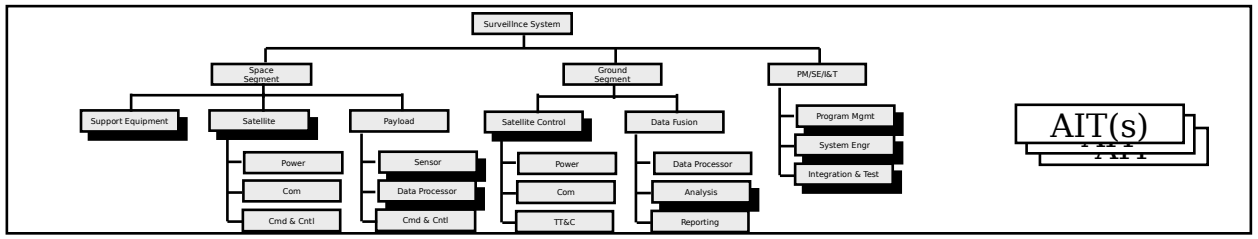
Integrated Master Plan

WBS	Events	Signfcant Accomplshmnts	Accomplishment Criteria	IPT
31000	DR#1 X	1. Prelim Design complet	1a. Subsys perf reqts alloc b. Duty cycle defined c. Prelim drawings released	SE Sat AIT

Integrated Master Schedule

WBS	Detailed Task	Program Events	19XX	19XX	19XX DR#1	IPT
31000	1a. Perform subsys analyses to define rqmts b. Analyze loads to define duty cycles c. Dev & print system and subsys drawings					SE Sat AIT

Integrated Product Teams



AIT - Analysis & Integration Teams

Two Parts of the IMP

IMP Matrix

WBS	Events	Signfcant Accomplshmnts	Accomplishment Criteria	IPT
31000	DR#1 X	1. Preliminary Design completed	1a. Subsys perf reqts alloc b. Duty cycle defined c. Prelim drawings released	SE Sat AIT
11000	X	2. Decision Data Base baselined	2a. Rqmts traceability verified b. No Widows/orphan rqmts c. Rqmts have references	SE SE AIT
31000	DR#2 X	1. Critical Design completed	1a. Subsys design complete b. Rqmts alloc to design c. Detailed drwgs released	SE Sat AIT

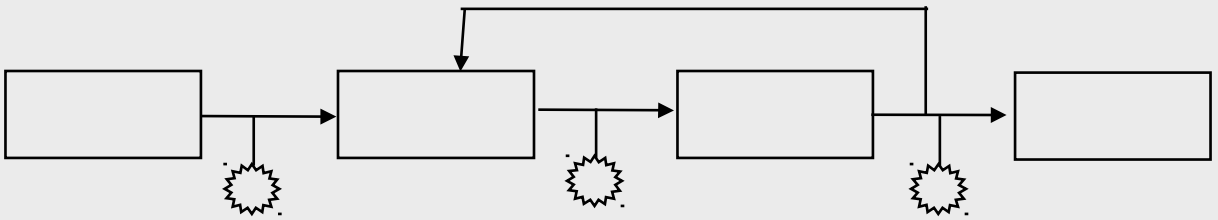
IMP Narrativ

Critical Process/Approach:

Objective:

Governing Documentation:

Process Description:



IMP Features

- Key Events - Activities to Meet Technical and Contract Requirements
  - Initiation/conclusion of an interval of major program activity.
  - Decision-point relating system maturity with continued system development.
- Significant Accomplishment
  - Specified result, substantiating an event, that indicates a level of design maturity (or progress) for each product/process. Generally a discrete step in the progress of the planned development.
  - Demonstrates that the design and production of products are successfully maturing.
- Accomplishment Criteria
  - Definitive measure(s) substantiating the maturity level of the significant accomplishment.
  - Completion of specified work that ensures closure of a specified "Significant Accomplishment."
- Narrative
  - A concise description of the Offeror's key functional processes/procedures, how they relate to the IPD process, and an overview of the efforts required to implement them.
  - Address only the key elements of implementing or developing a process/procedure (i.e., what the process/procedure will be or how it will be implemented)

IMP Attributes

- Tracability
  - Expands and complies with SOO, Perf Rqmts, CWBS, CSOW
  - WBS is lynch pin
  - Serves as basis for IMS, cost reports, award fee
  - Intuitive search, sort, query
- Implements a measurable and “trackable” program
  - Accomplishes Integrated Product Development
  - Integrates Functional Activities
  - Incorporates Functional, lower level, and Sub-Contractor(s) IMP(s)
- Provides for Evaluation of Program Maturity
  - Provides insight into the overall effort
  - Level of detail consistent with risk and complexity, per RFP Section L
  - Decomposes Events into a logical series of Accomplishments
  - Measurable Criteria demonstrates completion/quality of Accomplishments

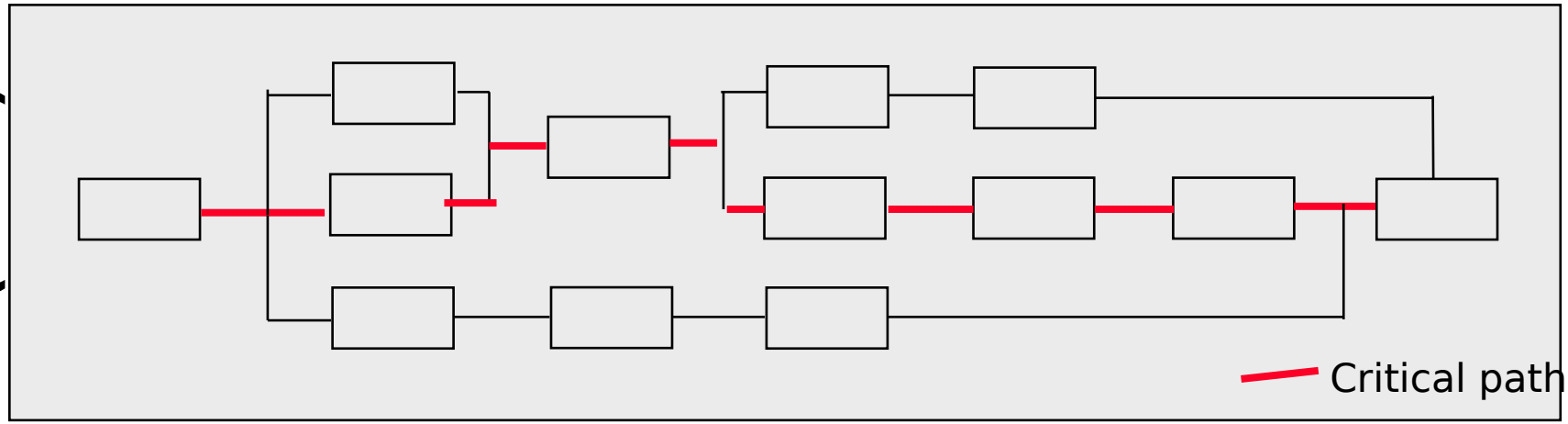
Two Views of the IMS

IMS GANTT

WBS	Detailed Task	Program Events	19XX	19XX	19XX
				DR#1	
31000	1a. Perform subsys analyses to define rqmts				
	b. Analyze loads to define duty cycles				
	c. Dev & print system and subsys drawings				

WBS	Detailed Task	Program Events	19XX	19XX	19XX
					DR#2
31000	1a. Perform subsys detailed design				
	b. Trace rqmts to subsystem components				
	c. Dev & print detailed drwgs of subsystems				

IMS NETWORK (PERT)



* *IMS includes resource allocation and utilization for*

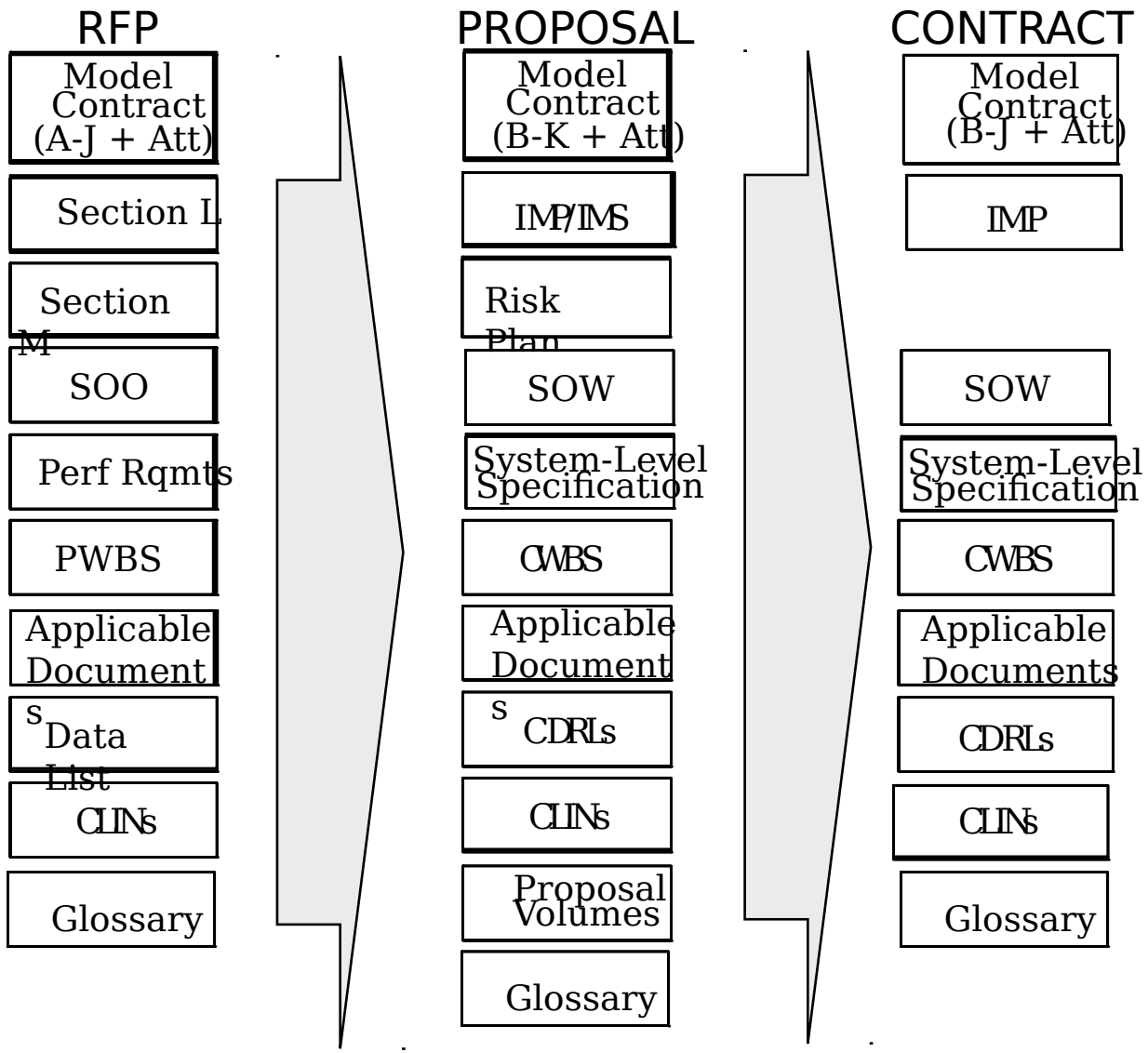
IMS Features

- Integrated, networked, multi-layered schedule of efforts required to achieve each IMP accomplishment
  - Detail tasks/work to be completed
  - Calendar schedule shows work completion dates
  - Network schedule shows interrelationships and critical path
  - Expanded granularity, frequency, and depth for risk areas and during initial contract period(s)
- Resource loading (utilization and allocation) for critical risk areas
- Not on contract, contractor has flexibility to adjust

IMS Attributes

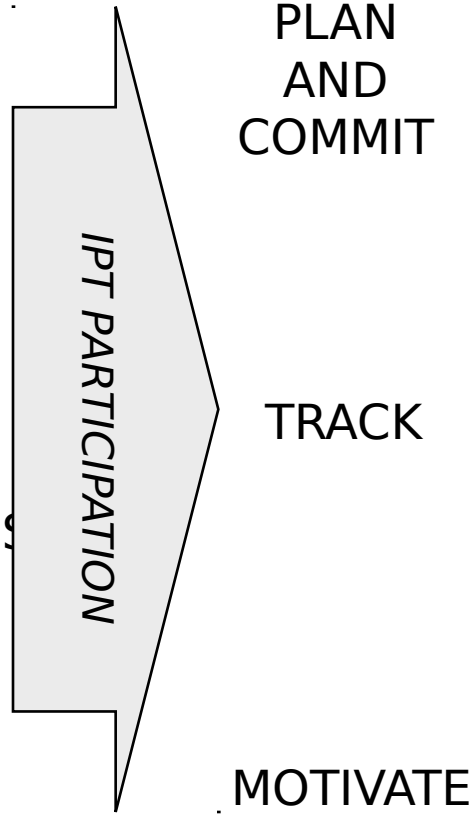
- Correlation of IMS work with IMP activities
- Lays out a measurable and trackable program
  - Provides visibility
  - Enhanced granularity, depth, frequency
    - Risk areas
    - During first period(s) after contract award
  - Basis for cost reports
- Identifies the critical path
- CDRL or government-accessible item

RFP - Proposal - Contract



IMF Toolset

- EVERY INDIVIDUAL/TEAM HAS A TOOL SET
- TOOL SET BEGINS WITH IDENTIFICATION OF A WBS ITEM
- TOOL SET INCLUDES:
  - WBS ELEMENT
  - SPECIFICATION PARAGRAPH
  - IMP SECTION
  - SOW TASKS
  - BUDGET
  - COST REPORTS
  - IMS SECTION
  - EVM (e.g., EARNED VALUE REPORTS)
  - TECHNICAL PERFORMANCE MEASURES
  - ACTION ITEM, RISK MITIGATION, CLOSURE PLANS
  - RQMTS MGMT
  - DECISION DATA BASE
  - MODELS AND SIMULATIONS
  - AWARD FEE



IPD and IMF Objectives

- Provides for measurable and traceable program
  - Concentrate effort on program products
  - Government and contractor manage to IMF
- Offeror plans and commits to an executable program
  - Offeror proposes a program plan (IMP/IMS), before contract award; used as partial basis for award
  - The offeror's Integrated Master Plan (IMP) becomes part of the contract
  - Fair contractual arrangement for government and contractor
  - Link resources to products
  - Link products to people

Summary

- IMF provides a disciplined approach to planning, organizing, and directing the program
- Relies on and maximizes government industry teaming
- Focuses all program activity on products
- Creates trackable program - concentrating resources